



Modular Prosthetic SCUBA Fins

By NextGen Prosthetics



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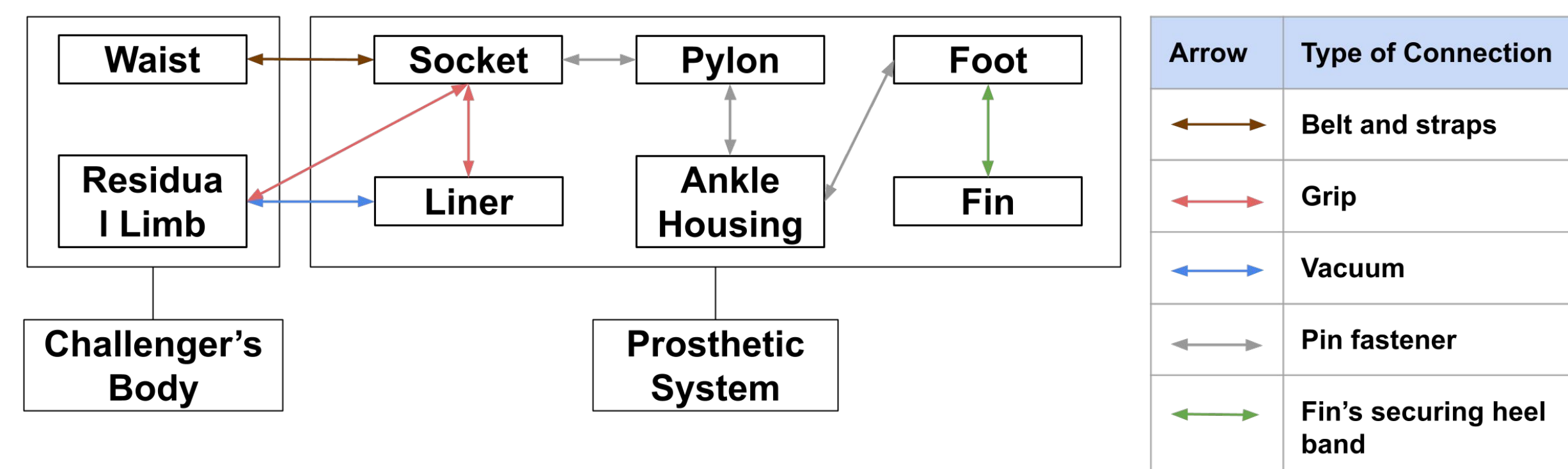


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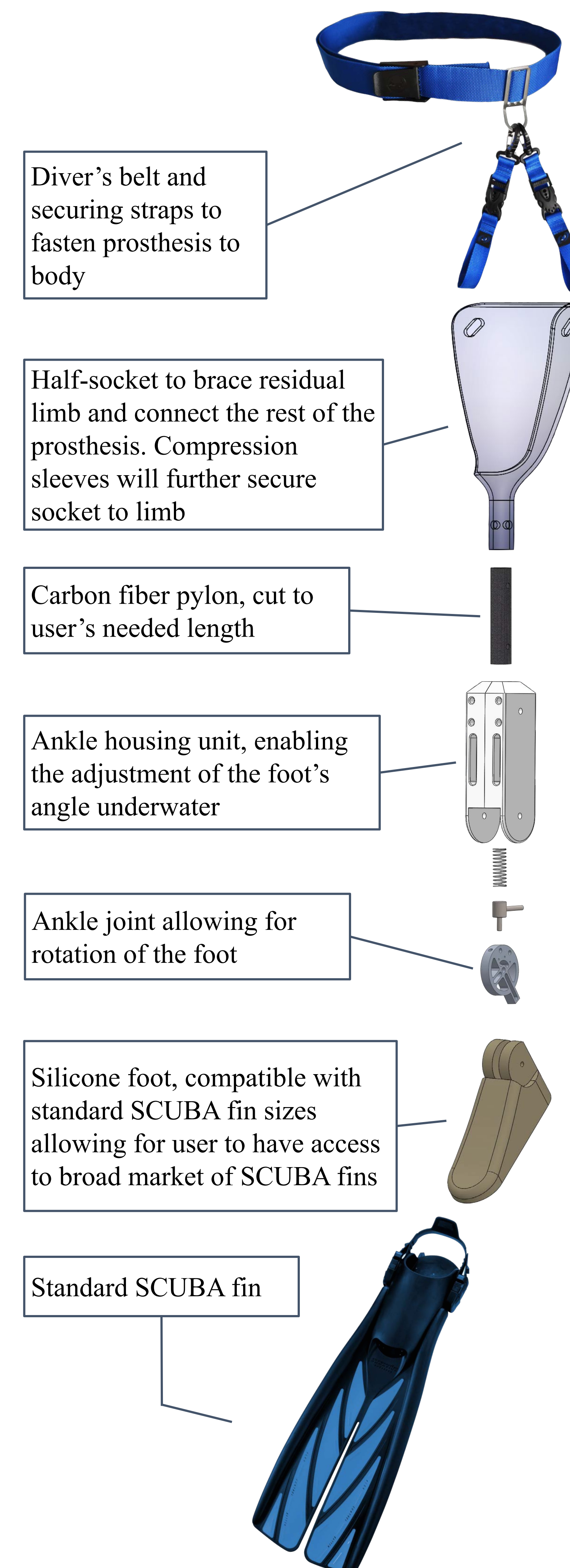


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System level Diagram



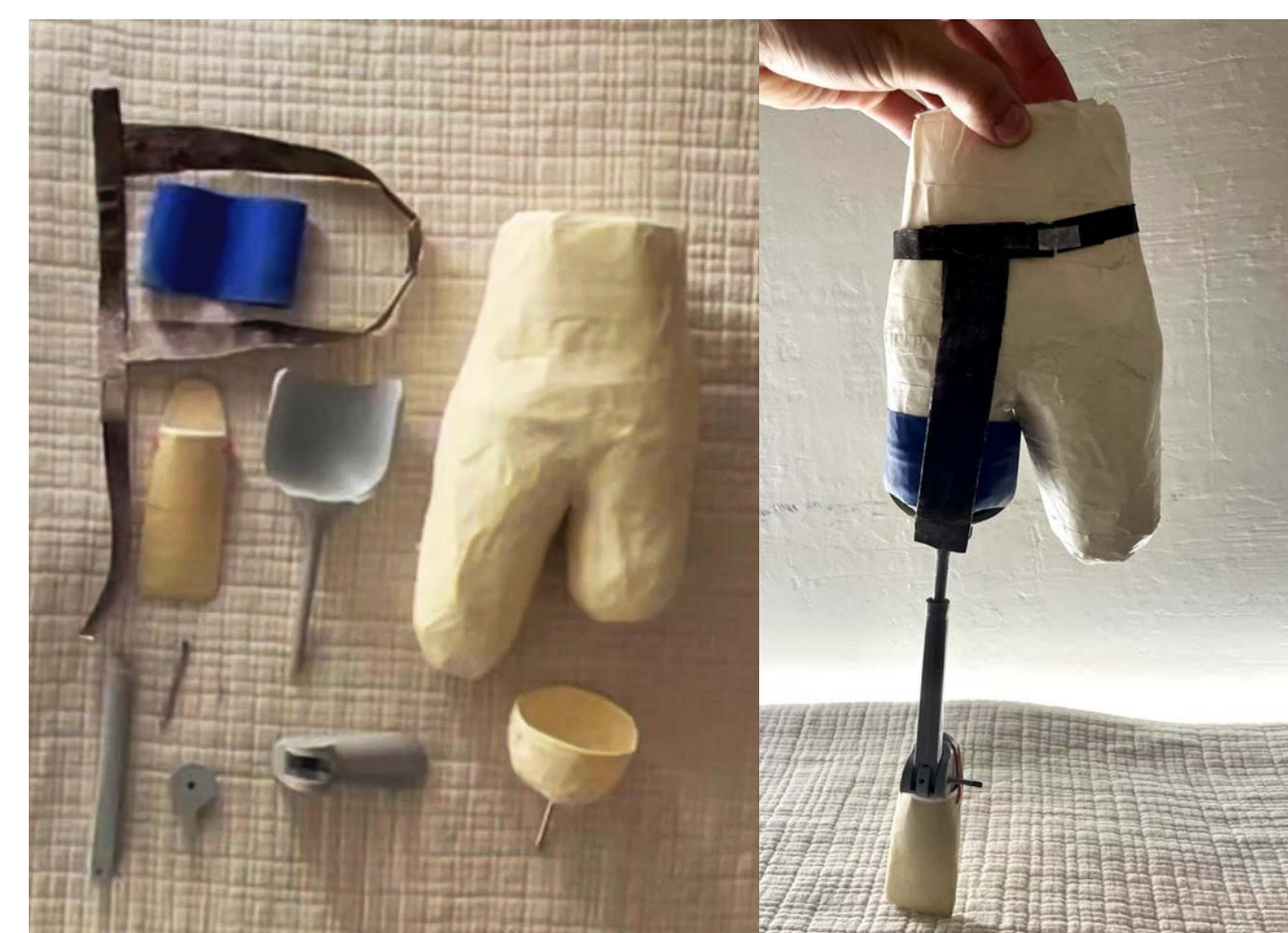
Final Design



Project Overview

This project was sponsored by Quality of Life + (QL+), a nonprofit organization that partners with universities to deliver solutions to veterans, law enforcers, and other nation-serving responders with life-altering injuries. The team proudly took on the project specific to Caleb Brewer, a wounded veteran with a left leg below-the-knee amputation and a right leg above-the-knee amputation. Mr. Brewer is engaged in various physical activities, with a special one being SCUBA diving; his amputations made it difficult to find functional SCUBA fins. The challenge was to design and build a prosthetic scuba fin solution for Mr. Brewer with a modular approach so that the prosthesis would also be compatible with other amputees who wish to SCUBA dive.

Prototypes



System Prototype 1 (1:4 scale)



Ankle Joint Prototypes 1, 2, and 3 (1:1 scale). This part experienced two redesigns for the purpose of reducing weight.

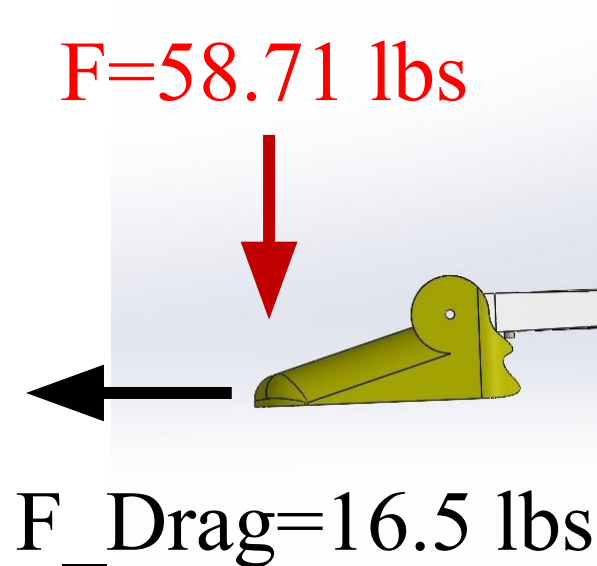


Foot and Fin prototype (1:1 scale); our foot CAD model was 3D printed to test fit it in a standard SCUBA fin before it was casted out of silicone.

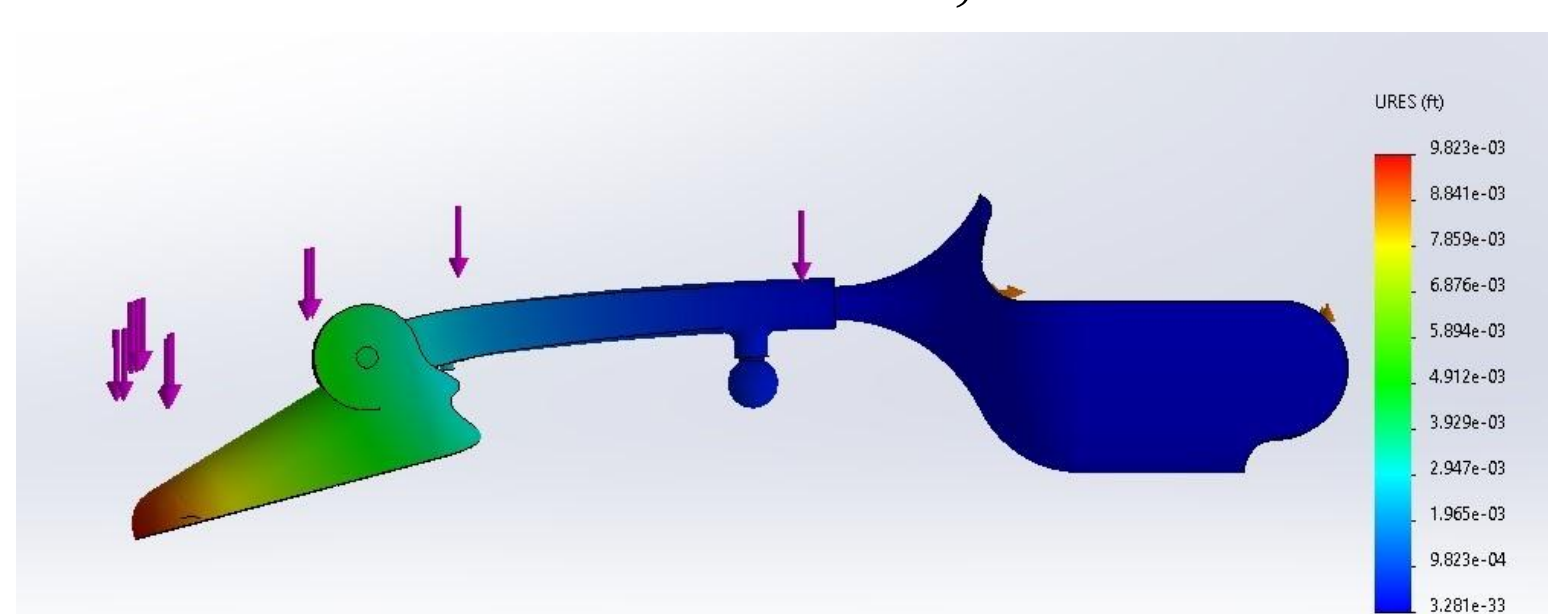


Prototype 2 (1:1 scale); for an underwater test.

Analysis



Downward Forces, FOS: 2.24



Upward Forces, FOS: 1.82

